AMENDMENTS TO THE CLAIMS:

This listing of the claims will replace all prior versions, and listings, of the claims in this application:

Listing of Claims:

1. (Currently amended) A method in a digital image processing chain in a device for adjusting a colour balance comprising:~~, in which method~~

- inputting to the device ~~the subject is imaged by pixels to form~~ value-sets of ~~the~~ colour components R, G, B ~~(R, G, B)~~ which have been formed by imaging a subject by pixels,

- forming component-specific histograms ~~are formed~~ from the value-sets of the colour components ~~(R, G, B)~~,

- forming cumulative histograms ~~are formed~~ from the component-specific histograms,

- defining an ~~the~~ illumination colour ~~(R_ill, G_ill, B_ill)~~ corresponding to at least one colour component ~~is defined~~ from the cumulative histograms,

- defining a gain factor adjusting the colour balance for at least two colour components using a target colour ~~(R_tgt, G_tgt, B_tgt)~~ and the defined illumination colour ~~(R_ill, G_ill, B_ill) are defined for at least two colour components (R, G, B) a gain factor (G_R, G_G, G_B) adjusting the colour balance~~,

~~characterized that, in the method~~

- defining from an essentially flat area of a colour curve at the ends of the cumulative histograms ~~a such~~ a common point h_i, at which ~~the~~ colour-component wise pixel-intensity values C_i, C_{i+1}, corresponding to ~~the~~ consecutive points h_i, h_{i+1}, meet ~~the~~ criteria conditions set for ~~them in the case of~~ at least one colour component ~~(R, G, B), is~~ defined from the essentially flat area of the colour curve at the ends of the cumulative histograms, and

- setting the ~~a~~ colour-component wise intensity value C_i, corresponding to ~~a~~the common ~~defined~~ point h_i ~~is set~~ for the at least one colour component ~~(R, G, B)~~, to correspond to the illumination colour ~~(R_ill, G_ill, B_ill)~~.

2. (Currently amended) A method according to Claim 1, ~~characterized in that~~ further comprising defining the illumination colour ~~(R_ill, G_ill, B_ill) is defined~~ from the cumulative histograms~~,~~ by. searching for a ~~the~~ smallest index i meeting the following sub-criteria:

1) a ~~the~~ ratio r_C of the pixel values C_i, C_{i+1}, corresponding to two consecutive points h_i, h_{i+1} selected according to a set interval division, is less than a first threshold value t_1 for ~~set for them~~, ~~in~~ each colour component ~~(R, G, B)~~, i.e.,

$$r_C = \frac{C_i}{C_{i+1}} < t_1, C = (R, G, B),$$

2) ~~such caused~~ a sum of the ratios r_c corresponding to the pixel values C_i, C_{i+1} is less than a second threshold value t_2 ~~set for them~~, where R_i, G_i, B_i correspond to C_i and R_{i+1}, G_{i+1}, B_{i+1} correspond to C_{i+1},

$$\frac{R_i}{R_{i+1}} + \frac{G_i}{G_{i+1}} + \frac{B_i}{B_{i+1}} < t_2, \text{ and}$$

3) the ratio of the relative speeds of change of the pixel values C_i, C_{i+1} between the maximum pixel-value change and the minimum pixel-value change is less than a third threshold value t_3 ~~set for it~~,

$$\frac{\max \left((C_i - C_{i+1})/C_{i+1}\right), \quad in\ which\ C \in R \| G \| B)}{\min \left((C_i - C_{i+1})/(C_{i+1})\right), \quad in\ which\ C \in R \| G \| B)} < t_3, \text{ and}$$

in which the intensity values C_i of each colour component corresponding to the point h_i, meeting the conditions 1 - 3, are set to correspond to the illumination colour ~~(R_ill, G_ill, B_ill)~~.

3. (Currently amended) A method corresponding to Claim 2, ~~characterized in that~~ wherein the first threshold value t_1 varies within the range 1.0 to 1.5 ~~1,0 - 1,5, preferably within the range 1,01 - 1,2~~.

4. (Currently amended) A method according to Claim 2, ~~characterized in that~~ <u>wherein</u> the second threshold value t_2 varies within the range <u>3.0 to 4.0</u> ~~3,0 4,0, preferably within the range 3,0 3,5.~~

5. (Currently amended) A method according to Claim 2, ~~characterized in that~~ <u>wherein</u> the third threshold value t_3 varies within the range <u>3.0 to 5.0</u> ~~3,0 5,0, being preferably about 4,0.~~

6. (Currently amended) A method according to Claim 1, ~~characterized in that, in the method,~~ <u>further comprising performing a</u> pedestal elimination ~~(PE) is also performed~~ on the pixel values of <u>a</u> ~~the~~ raw matrix~~,~~ prior to the colour-balance adjustment ~~(CBC)~~.

7. (Currently amended) A method according to Claim 6, ~~characterized in that~~ <u>comprising</u> <u>performing</u> the pedestal elimination~~,~~ ~~(PE) is performed~~ at least partly linearly~~, for example, in~~ such ~~a way~~ that

-          when the pixel-value level of a colour component ~~(R, G, B)~~ is below a threshold value ~~(t) set for it~~, an offset ~~(p)~~ is deducted by direct subtraction, and, <u>then, at a same time,</u> <u>deducting</u> ~~after the set threshold value (t),~~

-          the offset ~~(p)~~ ~~is deducted, however, at the same time~~ <u>and</u> gaining the pixel-values in such a way that the maximum pixel-value level does not substantially diminish.

8. (Currently amended) A method according to Claim 1, ~~characterized in that, in the method,~~ <u>further comprising performing</u> a vignetting elimination procedure ~~(VE) is also performed,~~ ~~preferably~~ after the pedestal elimination ~~(PE)~~ and before the colour-balance adjustment ~~(CBC)~~.

9. (Currently amended) A method according to Claim 8, ~~characterized in that~~ <u>further comprising</u> <u>using</u> a spatially varying offset and a pixel-value gain factor ~~(vf) are used~~ in the vignetting elimination procedure ~~(VE)~~.

10. (Currently amended) A method according to Claim 9, ~~characterized in that~~ <u>further comprising</u> <u>developing</u> the gain factor ~~(vf) is developed~~ separately for each colour component ~~(R, G, B)~~.

11. (Currently amended) A method according to Claim 1, ~~characterized in that, in connection with the method,~~ further comprising performing a dark-colour correction procedure ~~is also performed~~, in which, as sub-stages,

-           ~~such~~ pixel values meeting a threshold condition ~~(dpce)~~ ~~set for them~~ are determined ~~sought~~ from the cumulative histogram,

-           a ~~the~~ defined darkest colour component is stretched using an offset of a defined magnitude towards the dark end of the histogram, while also processing the other colour components in a ~~the~~ same proportion, and

-           readjustment is performed on the gains ~~(G_R, G_G, G_B)~~ of the conversion functions.

12. (Currently amended) A method according to Claim 1, ~~characterized in that~~ further comprising defining a median pixel value ~~is defined~~ for each colour component ~~(R, G, B)~~ and, if a ~~the~~ median pixel value of a ~~the~~ selected reference component and a ~~the~~ median pixel value of a ~~the~~ colour component ~~(R, G, B)~~ differ from each other in a set manner, adjusting the gains ~~(G_R, G_G, G_B) are adjusted,~~ in order to reduce the difference.

13. (Currently amended) A method according to Claim 1, ~~characterized in that the method also includes~~ further comprising performing a gamma-correction stage ~~GC~~, in which

-           a shot type, ~~which can be, for example, normal, backlight, or low-contrast,~~ is defined from the cumulative histograms,

-           on the basis of the shot-type definition, the gamma value selected for use in the gamma correction is reduced, in proportion to an amount ~~how much~~ the image is to ~~should~~ be brightened, wherein the ~~which~~ gamma value is ~~can vary, for example,~~ in the range of 0.10 to 0.80 ~~0,10 - 0,80, preferably in the range 0,20 - 0,60~~.

14. (Currently amended) A method according to Claim 1, ~~characterized in that,~~ further comprising filtering, prior to the formation of the cumulative histograms, at least one pixel value ~~such pixel values (G_(s))~~ out of at least one value set, in which the pixel value of the same image

point (15.1) in even one value-set meets a selected criterion, are filtered out of at least one value set.

15. (Currently amended) An apparatus system in a digital image processing chain (10) for adjusting a colour balance, which system includes comprising:

-           an input configured to image means for imaging a subject by pixels to form value-sets of the colour components R, G, B (R, G, B),

-           a first processing element configured to form means for forming component wise histograms from the value-sets of the colour components (R, G, B),

-           a second processing element configured to form means for forming cumulative histograms from the component wise histograms,

-           a third processing element configured to define an means for defining the illumination colour (R$_{ill}$, G$_{ill}$, B$_{ill}$) corresponding to at least one colour component from the cumulative histograms,

-           a fourth processing element configured to define means for defining a gain factor (G$_R$, G$_G$, G$_B$) for at least two colour components (R, G, B) adjusting the colour balance using target colour (R$_{tgt}$, G$_{tgt}$, B$_{tgt}$) and the defined illumination colour (R$_{ill}$, G$_{ill}$, B$_{ill}$),

characterized in that, the system also includes

-           a fifth processing element configured to define means for defining, from an the essentially flat area of the colour curve at an the end of the cumulative histograms, such a point h$_i$, in which the colour-component wise pixel-intensity values C$_i$, C$_{i+1}$, corresponding to the consecutive points h$_i$, h$_{i+1}$, are arranged to meet the criteria conditions set for them for in the case of at least one colour component (R, G, B), and

-           a sixth processing element configured to set means for setting the color-componentwise intensity value C$_i$, corresponding to the defined common point h$_i$, for at least one color component (R, G, B) to correspond to the illumination colour (R$_{ill}$, G$_{ill}$, B$_{ill}$).

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16. (Currently amended) An apparatus system according to Claim 15, characterized in that wherein the apparatus system also includes a functionality, arranged before the colour-balance adjustment (CBC), for performing pedestal elimination (PE) on the pixel values of a the raw matrix.

17. (Currently amended) An apparatus system according to Claim 15, characterized in that wherein the apparatus system also includes a seventh processing element configured to perform means for performing vignetting elimination (VE), which are preferably arranged after the pedestal elimination (PE) and before the colour-balance adjustment (CBC).

18. (Currently amended) An apparatus system according to Claim 15, characterized in that wherein the apparatus system comprises also includes means for correcting a dark colour.

19. (Currently amended) An apparatus system according to Claim 15, characterized in the wherein the apparatus system comprises also includes means for filtering out prior to the formation of the cumulative histograms at least such pixel values (G(s)) of at least one value set, in which a the pixel value of the same image point (15.1) in at least even one value set meets a selected criterion.

20. (Currently amended) An equipment for adjusting colour balance, in which the equipment includes a digital image-processing chain (10), in which the chain (10) includes

-       means for imaging a subject by pixels to form value-sets [R], [G], [B] of the colour components R, G, B (R, G, B),

-       means for forming component wise histograms from the value-sets of the colour components (R, G, B),

-       means for forming cumulative histograms from the component wise histograms,

-       means for defining a the illumination colour (R_ill, G_ill, B_ill) corresponding to at least one colour component from the cumulative histograms,

- means for defining a gain factor ~~(G_R, G_G, G_B)~~ for at least two colour components ~~(R, G, B)~~ adjusting the colour balance using <u>a</u> target colour ~~$(R_{tgt}, G_{tgt}, B_{tgt})$~~ and defined illumination colour ~~$(R_{ill}, G_{ill}, B_{ill})$~~,

~~characterized in that the equipment also includes~~

- means for defining, from <u>an</u> ~~the~~ essentially flat area of <u>a</u> ~~the~~ colour curve at <u>an</u> ~~the~~ end of <u>the</u> cumulative histograms, ~~such~~ a point h_i, in which ~~the~~ colour-component wise pixel-intensity values C_i, C_{i+1}, corresponding to ~~the~~ consecutive points h_i, h_{i+1}, are arranged to meet ~~the~~ criteria conditions <u>for</u> ~~set for them in the case of~~ at least one colour component ~~(R, G, B)~~, and

- means for setting the color-componentwise intensity value C_i, corresponding to the defined common point h_i, for at least one color component ~~(R, G, B)~~ to correspond to the illumination colour ~~$(R_{ill}, G_{ill}, B_{ill})$~~.

21. (Currently amended) <u>A computer readable storage medium embodied with a computer program comprising:</u> ~~Software means for implementing the method according to Claim 1, in which the include~~

- <u>software</u>~~an interface~~ for receiving image data<u>,</u>

- software for <u>inputting</u>~~imaging a subject by pixels to form~~ value-sets of the colour components ~~(R, G, B)~~ <u>which have been formed by imaging a subject by pixels,</u>

- software for forming component wise histograms from the value-sets R, G, B ~~[R], [G], [B]~~ of the colour components ~~(R, G, B)~~,

- software for forming cumulative histograms from the component wise histograms,

- software for defining the illumination colour ~~$(R_{ill}, G_{ill}, B_{ill})$~~ corresponding to at least one colour component from the cumulative histograms,

- software for defining a gain factor ~~(G_R, G_G, G_B)~~ for at least two colour components, ~~(R, G, B)~~ adjusting the colour balance using target colour, ~~(R_tgt, G_tgt, B_tgt)~~ and defining <u>defined</u> illumination colour ~~(R_ill, G_ill, B_ill)~~,

~~characterized in that, in the software means, there are also arranged~~

- software for defining, from <u>an</u> ~~the~~ essentially flat area of the colour curve at the end of cumulative histograms, ~~such~~ a point h_i, in which ~~the~~ colour-component wise pixel-intensity values C_i, C_{i+1}, corresponding to ~~the~~ consecutive points h_i, h_{i+1}, are arranged to meet ~~the~~ criteria conditions <u>for</u> ~~set for them in the case of~~ at least one colour component ~~(R, G, B)~~, and

- software for setting the color-componentwise intensity value C_i, corresponding to the defined common point h_i, for at least one color component ~~(R, G, B)~~ to correspond to the illumination colour ~~(R_ill, G_ill, B_ill)~~.

22. (New) A device in a digital image processing chain for adjusting a colour balance comprising:

- means for inputting value-sets of colour components formed by imaging a subject by pixels,

- means for forming component wise histograms from the value-sets of the colour components,

- means for forming cumulative histograms from the component wise histograms,

- means for defining an illumination colour corresponding to at least one colour component from the cumulative histograms,

- means for defining a gain factor for at least two colour components adjusting a colour balance using a target colour and the defined illumination colour,

- means for defining, from an essentially flat area of a colour curve at an end of the cumulative histograms a point h_i in which colour-component wise pixel-intensity values C_i,

C_{i+1} corresponding to consecutive points h_i, h_{i+1} arranged to meet criteria conditions for at least one colour component, and

- means for setting the color-componentwise intensity value C_i, corresponding to the defined common point h_i, for at least one color component to correspond to the illumination colour.

23. (New) A device according to Claim 22, wherein the device comprises a functionality, arranged before the colour-balance adjustment, for performing pedestal elimination on pixel values of a raw matrix.

24. (New) A device according to Claim 22, wherein the device comprises means for performing vignetting elimination, which are preferably arranged after the pedestal elimination and before the colour-balance adjustment.

25. (New) A device according to Claim 22, wherein the device comprises means for correcting a dark colour.

26. (New) A device according to Claim 22, wherein the device comprises means for filtering out prior to the formation of the cumulative histograms at least such pixel values of at least one value set, in which the pixel value of the same image point in even one value set meets a selected criterion.

27. (New) A device according to Claim 22 further comprising means for imaging a subject by pixels to form value-sets of the colour components.